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R R Institute of Technology

RAJA REDDY LAYOUT, NEAR CHIKKABANAVARA RAILWAY STATION, CHIKKABANAVARA, BENGALURU - 560090

An Autonomous Institution under VTU

Approved by AICTE, New Delhi & Government of Karnataka

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Course Title:	**Python Programming For Beginners**	Semester	I /II
COURSE CODE	**BPLCK105B /205B**	CIE Marks	50
Course Type (Theory/Practical/Integrated)	Integrated	SEE Marks	50
		Total Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:2:0	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	03

Course Learning Objectives

CLO1: To Recall syntax and semantics of the Python programming language.
CLO2: Understand the process of structuring the data using lists, tuples
CLO3: Apply the strings and file paths along with reading/writing.
CLO4: Demonstrate the use of built-in functions to navigate the file system.
CLO5: Implement the Object-Oriented Programming concepts in Python.

Teaching-Learning Process

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. Lecturer method (L) need not to be only traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes.
2. Use of Video/Animation to explain functioning of various concepts.
3. Encourage collaborative (Group Learning) Learning in the class.
4. AskatleastthreeHOT(HigherorderThinking)questionsintheclass,whichpromotescr i ticalthinking.
5. Adopt Problem Based Learning(PBL),which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it.
6. Introduce Topics in manifold representations.
7. Showthedifferentwaystosolvethesameproblemandencouragethestudentstocome up with their own creative ways to solve them.
8. Discusshoweveryconceptcanbeappliedtotherealworld-andwhenthat'spossible,ithelps to improve the students' understanding.
9. Use https://pythontutor.com/visualize.html#mode=edit in order to visualize theoperations of C Programs

Module-1: (8 hours)

Python Basics: Entering Expressions into the Interactive Shell, The Integer, Floating-Point, and String Data Types, String Concatenation and Replication, Storing Values in Variables, Your First Program, Dissecting Your Program, **Flow control:** Boolean Values, Comparison Operators, Boolean Operators, Mixing Boolean and Comparison Operators, Elements of Flow Control, Program Execution, Flow Control Statements, Importing Modules, Ending a Program Early with sys. exit (), **Functions:** def Statements with Parameters, Return Values and return Statements, The None Value, Keyword Arguments and print(), Local and Global Scope, The global Statement, Exception Handling, A Short Program: Guess the Number

Textbook 1: Chapters 1 – 3

Applications: Elementary for Python programming

(RBT Levels: L1, L2 and L3)

Module-2: (8 hours)

Lists: The List Data Type, Working with Lists, Augmented Assignment Operators, Methods, Example Program: Magic 8 Ball with a List, List-like Types: Strings and Tuples, References, **Dictionaries and Structuring Data:** The Dictionary Data Type, Pretty Printing, Using DataStructures to Model Real-World Things,

Textbook 1: Chapters 4 – 5

Applications: Writing programs in Python using Lists

(RBT Levels: L1, L2 and L3)

Module-3 : (8 hours)

Manipulating Strings: Working with Strings, Useful String Methods, Project: Password Locker, Project: Adding Bullets to Wiki Markup

Reading and Writing Files: Files and File Paths, The os. path Module, The File Reading/Writing Process, Saving Variables with the shelve Module, Saving Variables with the print. format() Function, Project: Generating Random Quiz Files, Project: Multiclipboard,

Textbook 1: Chapters 6 , 8

Applications: Use of Strings and File I/O in Python

(RBT Levels: L1, L2 and L3)

Module-4: (8 hours)

Organizing Files: The shutil Module, walking a Directory Tree, Compressing Files with the zipfile Module, Project: Renaming Files with American-Style Dates to European-Style Dates, Project: Backing Up a Folder into a ZIP File,

Debugging: Raising Exceptions, Getting the Traceback as a String, Assertions, Logging, IDLE‟s Debugger.

Textbook 1: Chapters 9-10

Applications: Python debugging concepts

(RBT Levels: L1, L2 and L3)

Module-5: (8 hours)

Classes and objects: Programmer-defined types, Attributes, Rectangles, Instances as return values, Objects are mutable, Copying,

Classes and functions: Time, Pure functions, Modifiers, Prototyping versus planning,

Classes and methods: Object-oriented features, Printing objects, Another example, A more complicated example, Theinit method, The str method, Operator overloading, Type-based dispatch, Polymorphism, Interface and implementation,

Textbook 2: Chapters 15 – 17

Applications: How to Class, Objects, Functions and Methods in Python

(RBT Levels: L1, L2 and L3)

Course outcome

At the end of the course the student will be able to:

CO1 Demonstrate proficiency in handling loops and creation of functions.

CO2 Identify the methods to create and manipulate lists, tuples and dictionaries.

CO3 Develop programs for string processing and file organization

CO4 Interpret the concepts of Object-Oriented Programming as used in Python.

Course Assessment and Evaluation Details (both CIE and SEE)

Continuous Internal Evaluation: 50 marks		
Theory Assessment Tool	**Marks**	**Reduced marks**
IAT-1	25	25
IAT-2	25	
Assessment -1(activity based)	25	25
Assessment-2(activity based)	25	
Semester End Examination (SEE) : 50 marks		
SEE	**Marks**	**Reduced marks**
Course end examination (Answer any one question from each unit – Internal choice)	100	50

Activity Based Learning / Practical Based learning

- Assign small tasks to Develop and demonstrate using Python

Programming Tasks:

1. a. Develop a program to read the student details like Name, USN, and Marks in three subjects. Displaythe student details, total marks and percentage with suitable messages.
   b. Develop a program to read the name and year of birth of a person. Display whether the person is asenior citizen or not.

2. a. Develop a program to generate Fibonacci sequence of length (N). Read N from the console.
   b. Write a function to calculate factorial of a number. Develop a program to compute binomialcoefficient (Given N and R).

3. Read N numbers from the console and create a list. Develop a program to print mean, variance andstandard deviation with suitable messages.

4. Read a multi-digit number (as chars) from the console. Develop a program to print the frequency ofeach digit with suitable message.

5. Develop a program to print 10 most frequently appearing words in a text file. [Hint: Use dictionary with distinct words and their frequency of occurrences. Sort the dictionary in the reverse order offrequency and display dictionary slice of first 10 items]

6. Develop a program to sort the contents of a text file and write the sorted contents into a separate text file. [Hint: Use string methods strip(), len(), list methods sort(), append(), and

file methods open(), readlines(), and write()].

7. Develop a program to backing Up a given Folder (Folder in a current working directory) into a ZIP File by using relevant modules and suitable methods.

8. Write a function named DivExp which takes TWO parameters a, b and returns a value c (c=a/b). Write suitable assertion for a>0 in function DivExp and raise an exception for when b=0. Develop a suitable program which reads two values from the console and calls a function DivExp.

9. Define a function which takes TWO objects representing complex numbers and returns new complex number with a addition of two complex numbers. Define a suitable class 'Complex' to represent the complex number. Develop a program to read N (N >=2) complex numbers and to compute the additionof N complex numbers.

10. Develop a program that uses class Student which prompts the user to enter marks in three subjects and calculates total marks, percentage and displays the score card details. [Hint: Use list to store the marks in three subjects and total marks. Use init () method to initialize name, USN and the lists to store marks and total, Use getMarks() method to read marks into the list, and display() method to display thescore card details.]

Suggested Learning Resources:

Text Books

1. Al Sweigart,**"Automate the Boring Stuff with Python"**,1stEdition, No Starch Press, 2015. (Available under CC-BY-NC-SA license at https://automatetheboringstuff.com/)
   (Chapters 1 to 18, except 12) for lambda functions use this link: https://www.learnbyexample.org/python-lambda-function/
2. Allen B. Downey, **"Think Python: How to Think Like a Computer Scientist",** 2nd Edition, Green Tea Press, 2015. (Available under CC-BY-NC license at http://greenteapress.com/thinkpython2/thinkpython2.pdf
   (Chapters 13, 15, 16, 17, 18) (Download pdf/html files from the above link)

Web links and Video Lectures (e-Resources):

- https://www.learnbyexample.org/python/
- https://www.learnpython.org/
- https://pythontutor.com/visualize.html#mode=edit

COs and POs Mapping (CO-PO mappings are only Indicative)

COs	POs											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	2	3	1	2						1	1
CO2	3		3	1	2						1	1
CO3	3	2	3	1								1
CO4	**3**		3	1	2							**1**
CO5	3	2	3	1	2							1

Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped